

Curation of asteroid Bennu samples for the OSIRIS-REx mission.

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Introduction: The OSIRIS-REx asteroid sample return mission will collect >150 g of material from carbonaceous asteroid Bennu and return it to Earth in 2023 [1]. The sample will be curated along with NASA's other astromaterials sample collections at Johnson Space Center (JSC) in Houston [2]. As part of the mission planning, JSC will be engaged in the following four general activities.

Curation Materials Archive: The curation and science teams have identified materials that may come into contact or line of sight of the collected sample. Portions of these materials have been saved and archived along with detailed information about each. By the time of launch in Sept. 2016, a materials archive catalog will be produced, available to the science team and ultimately the sample science community.

New sample cleanroom: Bulk asteroid sample and a separate set of surface contact pads will be curated in a new ISO 5 (Class 100) cleanroom to be built at JSC. Samples will be stored and processed in nitrogen cabinets and glove-boxes. A wide range of sample sizes is possible - from micron-sized dust particles to 3 cm rocks - and sample handling and subdivision techniques will be developed accordingly.

Recovery in Utah: The Sample Return Capsule (SRC) returns to the Utah Test and Training Range (UTTR) in September 2023. The curation team will assemble a portable ISO 6 (Class 1000) cleanroom at UTTR. The cleanroom will allow the SRC to be de-integrated and prepared for transport to Houston in a clean and controlled environment. The curation team will also have personnel directly involved in the sample recovery efforts.

Sample catalog and long-term curation: The curation team will work with the OSIRIS-REx preliminary examination team (PET) to characterize the organic and inorganic samples using a wide range of non-destructive techniques. These results, together with other basic information about the samples (mass, color, textures, grain sizes, etc.), will be combined to produce a sample catalog for the collection. In addition, during this early stage samples will be selected for transfer to international partners Japan and Canada, as well as to the remote storage at NASA White Sands Test Facility in New Mexico.

Personnel: These four areas of activity require some specialized personnel expertise. It will be essential for NASA to identify and train personnel well ahead of sample return to ensure mission success.

References: [1] Lauretta, D.S. et al. (2015) *MaPS* 50, 834-849. [2] Allen, C.C. et al. (2011) *Chem. der Erde-Geochem.* 71, 1-20.